# TECHNICAL REVIEW DOCUMENT OPERATING PERMIT 950PMF040

to be issued to:

Questar Gas Management Company
E. Hiawatha Compressor Station
Moffat County
Source ID 0810076

Prepared by David Webb on January 13, 1997 modified on May 8, 1997 Modified by Doris Jung on September 26, 1997

## I. Purpose:

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, the Public and other interested parties. Conclusions made in this document are based upon the Title V application submitted February 1, 1995, a supplemental technical submittal of June 16, 1995, as well as numerous phone contacts with the applicant.

## II. Source Description:

This source is classified as a natural gas compression facility defined under Standard Industrial Classification 4922. Gas is compressed to specification for transmission to a primary pipeline using three internal combustion engines to power compressor units. The natural gas stream is run through a glycol dehydration system to remove moisture. Combustion engines are also used to power a 60 KW generator which provides electricity to the plant. The facility also has methanol and condensate storage tanks. Methanol is injected into the gas stream prior to compression to prevent formation of water hydrates. Condensates are separated from the incoming gas stream using a series of separation and scrubbing vessels.

The facility is located approximately 70 miles northwest of the town of Craig, CO in an area designated as attainment for all criteria pollutants. This source is minor with respect to Prevention of Significant Deterioration (PSD) requirements with facility wide emissions as follows:

| <u>Pollutant</u> | <u>Potential to Emit (tpy)</u> | <u>ActualEmissions (tpy)</u> |
|------------------|--------------------------------|------------------------------|
| NO <sub>x</sub>  | 239                            | 154.9                        |
| VOC              | 50                             | 49.5                         |
| CO               | 199                            | 125.5                        |
| HAPs             | 20                             | 19.2                         |

Potential to Emit is based on the maximum design data submitted with the Title V

application for the regulated units covered by the Operating Permit. Actual emissions are based on data submitted on the latest Air Pollution Emission Notices filed with the Division (data year 1993).

This facility is classified as a gas transmission station, and therefore is exempt from Accidental Release Provisions of Section 112(r) of the CAAA of 1990. The facility is not within 100 kilometers of any Federally designated Class I area. Wyoming and Utah are within a 50 mile radius of the facility, and therefore will receive notice of Public Comment for the Operating Permit.

Questar Pipeline Company certified to operating in compliance with all applicable requirements at the time of application submittal in February of 1995.

#### III. Emission Sources:

The following sources are specifically regulated under terms and conditions of the Operating Permit for this Site:

<u>P101, P102, P103</u> - Ingersoll-Rand Standard Rich Burn Internal Combustion Engines Used to Power Compressor Units. Site Rated 660, 550 and 255 HP. Natural Gas Fired.

- **1. Applicable Requirements-** These units began operation in 1971, 1974, and 1957 respectively. Prior to October of 1983, Colorado Regulation No. 3, Part B, Section III.D.c.ii exempted engines less than 1000 HP from state permitting requirements. As noted above, all of these engines meet this exemption criteria or were installed prior to implementation of the State Permitting program in February of 1972. Consequently, the only applicable requirements for these engines are a Statewide 20% Opacity limitation and Air Pollution Emission Notice (APEN) Reporting in accordance with Colorado Regulation 3, Part A.II.
- **2. Emission Factors-** Emissions from these reciprocating engines are produced during the combustion process, and are dependent upon the air to fuel ratio adjustment, specific properties of the natural gas being burned, and engine design specifications. The pollutants of concern are Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC). Small quantities of Hazardous Air Pollutants (HAPs) are also emitted when combustion is incomplete. Approval of emission factors for these engines are necessary to the extent that accurate actual emissions are required to verify the need to submit Revised APENs to update the Division Emission Inventory. Questar Pipeline has indicated that the following emission factors for each engine were determined by Dresser-Rand, Painted Post, NY which represents manufacturer's data:

Pollutant

Emission Factor

| NOX | 16.0 grams/bhp-hr |
|-----|-------------------|
| CO  | 14.0 "            |
| VOC | 0.10 "            |

The above values are based on worst-case emissions within a typical range of air-fuel ratios for these engines. They are significantly higher than the EPA's AP-42 emission factors for standard rich burn engines found in Table 3.2-1 (10/96).

**3. Monitoring Plan-** Questar Pipeline Company has proposed to calculate emissions for fee purposes by multiplying the manufacturer's emission factors by the maximum site-rated horsepower and recorded hours of operation. They will be required to conduct the emission calculation annually and submit a Revised APEN to the Division if criteria emissions increase by more than 50 tons/year or 5%, whichever is less, compared to the latest APEN on file with the Division.

The Division has determined, based on AP-42 emission factors and engineering judgement, that particulate emissions from these engines will be insignificant if pipeline quality natural gas is used exclusively as fuel.

The attached Internal Combustion engine monitoring grid developed by the Division supports Questar's proposed monitoring scheme.

**4. Compliance Status-** Current APENs reporting actual criteria emissions for the 1993 data year are on file with the Division for all the reciprocating engines on site. The March 1, 1995 Operating Permit application submittal included a calculation of Hazardous Air Pollutant emissions based on EPA's SPECIATE Profile 1001 emission factors. All HAP emissions were correctly calculated to be below Colorado Regulation 3 reporting thresholds. Questar certified within the application that natural gas has been used exclusively as the fuel for these engines. Therefore, these engines are currently in compliance with all applicable requirements.

Units P301/302 - Waukesha Model F-817GU Internal Combustion Engines Powering a 60 KW Generator. Site Rated 80 HP Each. Natural Gas Fired.

**1. Applicable Requirements-** These engines were installed at the site in 1970, prior to the implementation of the State of Colorado permitting program. They are therefore grandfathered from permitting requirements, and subject only to the Statewide 20% Opacity limitation and APEN Reporting for annual fee determination. To maintain facility potential to emit below the 250 tpy PSD applicability level for  $NO_{\chi}$ , Questar Gas Management has agreed to accept a limitation on the simultaneous operation of these engines. Simultaneous operation will only be allowed during periods of transition from the use of one engine to the other, and will

be limited to one hour. Each engine is capable of providing the power necessary to provide for all electrical needs at the site.

**2. Emission Factors-** Pollutants of concern are the same as for Units P101-P103. Emission Factors as provided in the OP Application were supplied by the manufacturer, Waukesha, in Product Bulletin #290. These emission factors were used to calculate emissions for the 1993 APEN reporting, and are as follows:

| <u>Pollutant</u> | Emission Factor   |
|------------------|-------------------|
| $NO_x$           | 16.0 grams/bhp-hr |
| CO               | 1.02 "            |
| VOC              | 0.028 "           |

The high  $NO_{\chi}$  versus low CO factors indicate that these engines will operate in lean burn mode. Note that only one of these engines is operated at any one time. They are not designed to run in parallel.

- **3. Monitoring Plan-** Required Monitoring for these engines will be as outlined for Engines P101-103. The Monitoring Grid Developed by the Division calls for portable monitoring to measure exhaust gas oxygen concentration for engines operating in lean-burn mode. It has been determined, however, that the small size (80HP), function (electric generation), and no applicable emission limitations justify dropping this monitoring requirement. A log of specific dates and times that these engines run will be required to ensure that that the requirement regarding simultaneous operation is met.
- **4. Compliance Status-** See Compliance discussion for Units P101-P103.

# **Unit P501** - Black Sivalls Bryson Glycol Dehydration Unit

1. Applicable Requirements- The OP application listed that this dehydration unit was first placed into service in 1971. The Division requested documentation of the specific date in order to verify that this unit was grandfathered from permitting requirements. The documentation submitted indicated a purchase date of February 5, 1988. Therefore, Questar was informed that a Colorado Construction Permit would be required for the unit. An Initial Approval permit was generated (95MF187) based on the Air Pollution Emission Notice submitted for this source on January 20, 1995. Historically, dehydrator burner combustion emissions were considered the only source of pollution from these units. The January, 1995 submittal was part of a required effort to quantify VOC emissions from the still vent portion of these dehydrators. Based upon the Final Approval Certification submitted by Questar, the Division granted Final Approval for Permit 95MF187 on October 3, 1997.

- A March 5, 1996 letter was received from Questar requesting changes to Permit 95MF187. The changes were based on a higher gas processing rate and revised gas analysis than were used originally. The limitations listed under Condition 3.1 of the Operating Permit incorporate these changes. Questar's requested that the hourly emission limit be dropped since there was not an hourly emission limit in the modified Permit 95MF187. In the original Permit 95MF187, an hourly emission limit was included. At the time of drafting the modified Permit 95MF187, there was some confusion between EPA and the Division about the requirements for short term limits and subsequently, the short term limit was omitted in the modified construction permit. However, during the revisions to the final draft of the operating permit, an hourly emission limit was reinstated in order to make the operating permit enforceable as a practical matter.
- 2. Emission Factors- Triethylene glycol is contacted with the natural gas stream to remove moisture. This mixture is heated in the still vent portion of the unit which drives off the water and some entrained VOCs. Emissions from this process are typically predicted using the Gas Research Institute's GLYCalc Model. Emission factors of VOCs and various HAPs are dependent upon the variables input into this Model. These variables include glycol recirculation rate, cubic feet of gas processed, desired moisture content (dew point) of processed gas, and percentage breakdown by volume of constituents in the natural gas. Combustion emissions from the heater are exhausted through a separate stack. The heater at this site is rated at 500,000 BTU/hr and falls under the insignificant activity category of Colorado Reg. 3, Part C, Section II.E.3.k. Therefore, emissions from the heater do not need to be considered for the Operating Permit.
- **3. Monitoring Plan-** Questar Pipeline will use the GRI GLYCalc Model to predict annual emissions of VOC and HAPs from the still vent of this dehydration unit to determine compliance with VOC emission limitations. Monthly recording of system parameters will be conducted as outlined in Condition 3.1 of the Draft Operating Permit to ensure accurate input to the Model. A quarterly analysis of the natural gas composition will be conducted in accordance with condition 3.2 of the permit. These monitoring requirements are consistent with the monitoring grid developed by the Division for Glycol Dehydration units (attached).
- **4. Compliance Status-** An APEN reporting 48.6 tpy of VOC emissions, and a breakdown of HAP emissions for the 1993 data year was submitted on January 20, 1995. An application for a Colorado Construction Permit accompanied this submittal. Initial Approval Permit 95MF187 was generated based on the maximum gas throughput and the associated emissions predicted by GLYCalc. Application for the appropriate Construction Permit for the still vent portion of Glycol Dehydration units was

required by December 31, 1994. The Division had traditionally only considered combustion emissions from the glycol burner. Therefore, Questar Pipeline is currently in compliance with all applicable requirements for this unit.

## IV. Insignificant Activities

## **Fugitive Emissions from Equipment Leaks**

In response to a technical information request letter from the Division dated April 21, 1995, Questar Pipeline submitted calculations of Fugitive VOC emissions from equipment leaks based on emission factors in EPA's Protocol for Emission Leak Estimates. The factors used were Screening Values for sources with documented leaks from all affected equipment under 10,000 ppmv. Questar has implemented an annual leak detection survey to test leak levels using portable monitors. Using an inventory of facility valves, seals etc., emissions were found to be below the 2 ton per year reporting threshold (Regulation 3, Part A, Section II). In addition, the New Source Performance Standard for Equipment Leaks from Onshore Natural Gas Processing Facilities has been specifically identified as non-applicable to this source in Section III of the Operating Permit.

# **Emissions from Purging/Venting during Start-up or Shut-Down**

In response to the April 21, 1995 technical request, Questar Pipeline documented the expected emissions during an Emergency Shutdown of this facility. 9,000 scf of gas was estimated to be the amount sent to the atmosphere during such an event. Given the low VOC content in the typical gas stream, this calculates to well below the reporting threshold for VOC and/or Hazardous Air Pollutants.

#### **Temporary Engine Replacement-**

Typically, replacement engine units are not brought on site. Questar has indicated that the Division will be notified prior to installation, and will meet any appropriate permitting requirements prior to start-up.

#### V. Permit Shield

As noted in Section III of the Operating Permit, New Source Performance Standards for Equipment Leaks at Onshore Natural Gas Processing Facilities (40CFR60 Subpart KKK) do not apply to this source. Facility startup was prior to the applicability date for this regulation (January 20, 1984).